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SUBJECT: TECHNICAL GUIDANCE DOCUMENT ON POLYCHLORINATED BIPHENYLS (PCBs) MANAGEMENT

Pursuant to EMB Memorandum Circular 2015-004, this Technical Guidance is hereby issued to serve as a guide for the identification, inventory, handling, storage and transport, environmentally sound treatment and disposal, health and safety, emergency preparedness and response, personnel training and preparation of PCB Management Plan. The intended users include anyone who will handle PCB containing equipment, PCB owners and the EMB staff in the enforcement of the Chemical Control Order (CCO) for PCBs.

This Technical Guidance supports the DENR Administrative Order 2004-01 (Chemical Control Order for PCBs, EMB Memorandum Circular 2015-004 (Clarifications to the CCO of PCBs) and DAO 2013-22 (Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36)).

Specifically, it provides procedures and strategies for the following PCB management processes:

- Registration
- Identification
- Inventory
- Handling, storage, and transport
- Environmentally sound treatment and disposal
- Health and safety
- Emergency preparedness and response
- Personnel training
- Preparation of PCB Management Plan

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DEFINITION OF TERMS

- a. *"Chemical Control Order (CCO)"* means an order which prohibits, limits, and regulates the import, manufacture, distribution, transfer, sale, use, processing, possession, transport, storage, treatment, and/or disposal of Polychlorinated Biphenyls (PCBs) and their waste products.
- b. "Decommissioning" refers to the retirement of equipment from active service.
- c. "Decontamination" refers to an operation to ensure a sustainable level of PCBs in oil and porous materials of below 2 parts per million (ppm) or PCBs in non-porous materials or equipment at less than or equal to 10 micrograms per 100 square centimeter (μ g/100 cm²).
- d. "Dielectric Fluid" is an oily substance that is used to provide an insulating barrier in electrical equipment due to its excellent thermal stability and fire resistance.
- e. "DENR" refers to the Department of Environment and Natural Resources created by virtue of Executive Order 192.
- f. *"DENR Administrative Order (DAO) 2013-22"* refers to the Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36).
- g. "EMB" refers to the Environmental Management Bureau of the DENR.
- h. "EMB Memorandum Circular (MC) 2015-004" refers to the EMB issuance providing clarifications to the CCO for PCBs.
- i. *"EMB-Registered Laboratory"* refers to a laboratory facility that passed the proficiency requirements of EMB, provided in MC 2014-007, for laboratories to perform analysis of PCBs in transformer oil, waste oil, and non-porous surface materials.
- j. *"Emergency"* means any unplanned event that can cause injury or death to employees, customers, or the public; or can cause physical or environmental damage.
- k. *"Establishment*" refers to a recognizable economic unit under a single ownership or control, i.e., under a single legal entity, which engages in one or predominantly one kind of economic activity at a single physical location. This includes industrial, commercial, and institutional establishments.
- 1. "*Gas Chromatography*" refers to a technique for separating chemical substances in which the sample is carried by a moving gas stream through a tube packed with a finely divided solid that may be coated with a film of a liquid.
- m. *"Importation"* means the entry of a product or substance into the Philippines (through the seaports or airports of entry) after having been properly cleared through or still remaining under customs control, the product or substance of which is intended for direct consumption, merchandising, warehousing, for further processing.

- n. *"Managing Head"* refers to the highest executive officer of the establishment (i.e. President, General Manager, Factory/Plant Manager, Managing Director, Managing Partner, Chief Executive Officer, or Local Chief Executive).
- o. "Manufacture" means the mechanical or chemical transformation of substances into new products whether work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail.
- p. "*Non-PCB Equipment*" means any equipment containing dielectric oil with PCB concentration from 2 to less than 50 ppm (2 ppm ≤ PCB < 50 ppm).
- q. "*PCB*" means aromatic compounds formed in such a manner that the hydrogen atoms on the biphenyl molecule (two benzene rings bonded together by a single carbon bond) may be replaced by up to 10 chlorine atoms. It includes any one of a number of 209 congeners containing 1 to 10 chlorine atoms attached to a biphenyl group.
- r. "*PCB-Contaminated Equipment*" means any equipment containing dielectric oil with PCB concentration from 50 to less than 500 ppm (50 ppm ≤ PCB < 500 ppm).
- s. "PCB-Contaminated Non-Porous Materials" means any non-porous material with PCB concentration greater than $10 \ \mu g/100 \text{ cm}^2$ based on a wipe test of the non-porous surface $[10X10 \ \text{cm}^2]$ that have been in direct contact with PCBs (PCB > $10 \ \mu g/100 \text{ cm}^2$).
- t. "*PCB-Contaminated Oil*" means oil with PCB concentration from 2 to less than 500 ppm (2 ppm <u>< PCB < 500 ppm</u>).
- u. "PCB-Contaminated Porous Materials" means any porous material with PCB concentration greater than or equal to 2 ppm (PCB > 2 ppm).
- v. "*PCB Equipment*" means any equipment containing dielectric oil with PCB concentration equal to or greater than 500 ppm (PCB ≥ 500 ppm).
- w. "*PCB-Free Certificate*" refers to the certificate of laboratory analysis declaring PCB content of less than 2 ppm (PCB < 2 ppm).
- x. "PCB-Free Equipment" means any equipment containing dielectric oil with PCB concentration less than 2 ppm (PCB < 2 ppm).
- y. "*PCB-Free Oil*" means oil with PCB concentration of less than 2 ppm (PCB < 2 ppm).
- z. "PCB-Free Non-Porous Materials" means any non-porous material that has PCB concentration of less than or equal to $10 \ \mu g/100 \text{cm}^2$ based on a wipe test (PCB $\leq 10 \ \mu g/100 \text{cm}^2$).
- aa. "*PCB-Free Porous Materials*" means any porous material that has PCB concentration of less than 2 ppm (PCB < 2 ppm).
- bb. "PCB Oil" means oil with PCB concentration greater than or equal to 500 ppm (PCB \geq 500 ppm).

- cc. "PCB Owner" means a person, organization, or establishment that owns, distributes, uses, operates, recycles, reprocesses, stores, treats, or disposes any equipment, materials, or wastes that are contaminated with, in direct contact with, or containing PCB oil, PCB-contaminated oil, PCB equipment, PCB-contaminated equipment, Non-PCB equipment, PCB-contaminated porous materials, PCB-contaminated non-porous materials, and PCB wastes.
- dd. "*PCB Wastes*" means any equipment or materials that contain PCBs or have been in contact with PCBs that are without any safe commercial, industrial, agricultural, or economic usage as defined in the Implementing Rules and Regulations for Hazardous Waste Management (DAO 2013-22).
- ee. *"Persistent Organic Pollutants (POPs)"* refers to chemical substances that persist in the environment, bio-accumulate through the food web, can travel long distances, and pose a risk of causing adverse effects to human health and the environment.
- ff. *"Person"* or *"Persons"* includes any being, natural or juridical, susceptible of rights and obligations or of being the subject of legal relations.
- gg. "*Personal Protective Equipment (PPE)*" refers to clothing or ensembles for eye, skin, and/or respiratory protection, the level of which is dependent on the hazards and the routes of exposure.
- hh. *"Pollution Control Officer (PCO)"* is a technical person competent in pollution control and environmental management, performing the duties and responsibilities in a particular establishment and officially accredited by the EMB Regional Office (RO).
- ii. "*ppm*" means parts per million equivalent is the concentration in a liquid and in a solid equivalent to mg/kg.
- jj. "*Registrants*" refers to the PCB owners that secured registration under the CCO for PCBs and are required to submit PCB Inventory Report, PCB Management Plan; and subsequently phase-out and treat and dispose their PCBs in accordance with the approved PCB Management Plan.
- kk. "*Registration*" refers to the registration process for PCB Owners, PCB Wastes Generators, PCB Waste Transporters, and PCB Treatment, Storage, and Disposal (TSD) Facilities.
- 11. *"Regulations"* means this set of rules and regulations and such rules and regulations as may be formulated by DENR or EMB.
- mm. "*Retro-fill*" refers to the replacement or substitution of PCB fluids in transformers with mineral oils or any other suitable dielectric fluid.
- nn. "*Risk*" refers to the likelihood of potential adverse effects resulting from a given exposure to PCBs.
- oo. "Transport" refers to any mode of conveyance whether by air, water, or land.
- pp. "Treatment, Storage, and Disposal (TSD) Facilities" are facilities registered to treat, store, or disposed of PCBs.

- qq. "Use" means either in-service or online when being referred to equipment potentially containing PCBs.
- rr. *"Waste Generator"* means a person or entity which generates PCB Wastes, through any institutional, commercial, industrial, or trade activities.
- ss. *"Waste Transporter"* means a person or entity registered to legally transport PCBs as described in the scope of DAO 2004-01.

1.0 INTRODUCTION

This Technical Guidance Document(hereafter referred to as Guidance) for Polychlorinated Biphenyls (PCBs) Management is developed to guide establishments in the development and implementation of their PCB Management Plans, which aim to eliminate the use of PCBs and manage and dispose them in an environmentally sound manner. This Guidance provides procedures and strategies for the following processes:

- Registration
- Identification
- Inventory
- Handling, storage, and transport
- Environmentally sound treatment and disposal
- Health and safety
- Emergency preparedness and response
- Personnel training
- Preparation of PCB Management Plan

The protocols in this Guidance supplements the requirements of Environmental Management Bureau (EMB) Memorandum Circular (MC) 2015-004: Clarifications to the Chemical Control Order (CCO) for PCBs. Consequently, provisions stated in EMB MC 2009-001: Code of Practice on the Management of PCBs are repealed.

1.1 BASIC FACTS ON PCB

This section provides an overview of PCBs, its properties, industrial applications, and impacts to human health and the environment.

1.1.1 Properties of PCBs

Figure 1. Chemical Structure of PCBs

PCBs belong to a class of synthetic chemical compounds formed by the chlorination of a biphenyl with chlorine gas (Figure 1). This chlorination process can produce up to 209 PCB congeners or PCB compounds with varying numbers of chlorine and different places of attachment to the biphenyl ring.



biphenyl with chloride groups

The chemical structure of PCBs underpins its unique properties as summarized in Table 1.

Property	Implication		
High Flash Point	Makes PCBs less flammable		
High Boiling Point	Makes PCBs a good dielectric fluid since it can absorb more		
	thermal energy than mineral oil		
Low Solubility	Cannot dissolve easily in water, making PCBs persistent		
	organic pollutants		
High Density	Makes PCBs more easily identifiable since it is immiscible		
	withwater		
Low Vapor Pressure	Prevents PCBs from easily volatizing into the atmosphere		

Table 1. General Properties of PCBs

1.1.2 Industrial Applications

PCBs were first synthesized from coal tar in the 1880s and were commercially produced in the United States (US) starting the 1920s. They are commonly used as dielectric fluids for transformers and capacitors largely due to their high boiling point, low flammability, low vapor pressure, chemical stability, and good electrical insulating properties. They are also used in other industrial applications such as extenders for pesticides, and ingredients for caulking compounds, paints, adhesives, and flame retardants. Some common trade names of PCBs are listed in Annex 1 of this Guidance.

Due to the adverse health effects of PCBs, commercial production in the US stopped in the 1970s. However, other countries, such as France, Germany, Japan, Italy, and Russia, have only ceased commercial production after several years.

1.1.3 Impacts to Human Health and the Environment

PCBs are toxic compounds which induce several negative health effects, the most common of which are chloracne and skin rashes. Exposure to PCBs can also result to neurological problems such as headache, dizziness, depression, fatigue, and a tingling sensation in the hands. On chronic exposure, PCBs can cause cancers of the digestive system, especially liver cancer, as well as malignant melanoma. Furthermore, PCBs have been proven to cause severely negative health impacts on the offspring of mothers exposed to PCBs; as PCBs affect the growth rate and development of the fetus as well as its neurological functions and immune system.

Once in the environment, PCBs do not easily break down and they remain in different environmental media for long periods of time. They can be adsorbed in soil and sediments, and thus can be absorbed by plants. PCBs also biomagnify in the food chain as illustrated in Figure 2.



Figure 2. Illustration on the Biomagnification of PCBs

1.2 LEGAL AND REGULATORY FRAMEWORK

This Guidance was developed to enforce the provisions of Republic Act (RA) 6969, its Implementing Rules and Regulations, particularly DENR Administrative Order (DAO) 2004-01: CCO for PCBs and EMB MC 2015-004 covering the importation, manufacture, distribution, trade, sale, transfer, use, processing, reuse or recycling, handling, storage, transport, treatment, and/or disposal of PCBs in the Philippines. Equally, compliance requirements on hazardous waste management by virtue of DAO 2013-22: Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36) are the foundation of this Guidance

In addition, this Guidance in consistent with Articles 3 and 6 and Annex A of the Stockholm Convention on Persistent Organic Pollutants (POPs), ratified by the Philippine Senate on February 2, 2004 through Senate Resolution No. 106.

2.0 REGISTRATION

This section discusses in detail the registration process of establishments for the purpose of compliance with DAO 2004-01 and MC 2015-004.

2.1 RATIONALE FOR REGISTRATION

Registration is the official process by which EMB can identify establishments covered by DAO 2004-01. Similar to other EMB Registration Processes, each registered establishment will be provided with unique and permanent registration identification number.

2.2 QUALIFICATION FOR REGISTRATION

PCB Owners that own, use, operate, store, handle, or have any of the following materials and equipment must register in accordance with Section 2.3 of this Guidelines:

- Transformers (oil filled)
- Capacitors (oil filled)
- Voltage regulators (oil filled)
- Oil circuit breakers
- Hydraulic fluids
- Heat transfer fluids

Exhibit 1 presents pictures of equipment potentially containing or contaminated with PCBs.

For utilities (e.g. electricity distribution, electricity transmission, water supply, etc.) that use, store, or have any of the above-

mentioned materials and equipment, registration shall be per substation (e.g. electricity distribution/transmission substation) or station (e.g. water pumping station/reservoir).

2.3 PROTOCOLS OF REGISTRATION

As mandated by DAO 2004-01 and clarified through EMB MC 2015-004, all PCB Owners are required to register with the concerned EMB Regional Office (RO) through the Online PCB Database (www.emb.gov.ph/philpcbtracker).

The PCB registration process is outlined in Figure 3. As seen in the figure, all PCB Owners, whether or not they have already registered under DAO 2004-01, are required to register. In accordance with EMB MC 2015-004, all PCB Owners must comply with the requirements and deadline of the registration process as shown in Table 2.

Exhibit 1. Sample Equipment Potentially Containing or Contaminated with PCBs



Registrants	Required Action	Deadline
Previously registered PCB Owners	riously registeredReview and update registrationOwnersinformation in the Online PCB	
	Database	
Non-registrants under Pay registration fee at the concerned		
DAO 2004-01	EMB RO then fill out registration	
	information in the Online PCB	
	Database	

Table 2. Required Actions and Deadline for the Registration Process

Upon update or fill out of the registration, the Online PCB Database shall automatically send an email to the concerned EMB RO indicating the need for them to review the registration information. The concerned EMB RO is given 15 days to review the establishment's registration. If the registration is approved, the concerned EMB RO shall prompt the Online PCB Database to send an email to the registrant, through its designated Pollution Control Officer (PCO) informing them of the approval, along with a temporary CCO Registration Certificate (not yet an official EMB registration). The official CCO Registration Certificate is presented in Annex 2.

On the other hand, if the registration is disapproved; an email notification will be sent by the concerned EMB RO informing them on the reasons for the disapproval, along with a deadline to comply with the requirements.



Figure 3. Online Registration Process of PCB Owners

3.0 IDENTIFICATION

The purpose of identification is to appropriately classify PCB oil, equipment, materials, and waste according to the classifications specified in Section 3.1 of this Guidance. Moreover, PCB identification determines the PCBs that warrant treatment and disposal and those that need further laboratory analysis to be declared as PCB-free.

3.1 CLASSIFICATION

Materials, equipment, or wastes shall be classified based on their PCB concentration as described in Table 3.

Type of PCBs	Description	РСВ	
		Concentration	
PCB Oil	Oil with PCB concentration greater	PCB <u>></u> 500 ppm	
	than or equal to 500 parts per		
	million (ppm)		
PCB-Contaminated	Oil with PCB concentration from 2 to	2 ppm <u><</u> PCB <	
Oil	less than 500 ppm	500 ppm	
PCB Equipment	Any equipment containing dielectric	PCB <u>></u> 500 ppm	
	oil with PCB concentration equal to		
	or greater than 500 ppm		
PCB-Contaminated	Any equipment containing dielectric	50 ppm <u><</u> PCB <	
Equipment	oil with PCB concentration from 50	500 ppm	
	to less than 500 ppm		
Non-PCB	Any equipment containing dielectric	2 ppm <u><</u> PCB < 50	
Equipment	oil with PCB concentration from 2 to	ppm	
	less than 50 ppm		
PCB-Contaminated	Any porous material with PCB	PCB <u>></u> 2 ppm	
Porous Material	concentration greater than or equal		
	to 2 ppm		
PCB-Contaminated	Any non-porous material with PCB	PCB > 10	
Non-Porous	concentration greater than 10	µg/100cm ²	
Material	micrograms per 100 square		
	centimeter (µg/100cm ²) based on a		
	wipe test of the non-porous surface		
	[10X10 cm ²] that have been in direct		
	contact with PCBs		

Table 3. PCB Classification

Any equipment or materials that contain PCBs or have been in contact with PCBs that are without any safe commercial, industrial, agricultural, or economic usage are classified as PCB wastes. Table 4 classifies the various types of materials that can be considered as PCB waste. Furthermore, as specified in DAO 2013-22, PCB wastes are considered as hazardous wastes and shall be classified as L404.

Classification of PCB Wastes	Description	
Liquid PCB wastes	 PCB-based dielectric fluids removed from transformers and other equipment PCB-based heat transfer and hydraulic fluids 	

Table 4. Classification of PCB Wastes

Classification of PCB Wastes	Description		
	 PCB-contaminated liquids Washings of PCB-contaminated materials Leakages, spillages, and splashes of PCB-based fluids due to mishandling or accidents 		
Porous PCB wastes	 Materials used in cleaning PCB equipment or absorbing the spillages such as but not limited to rags, sawdust, contaminated clothing, gloves, and gaskets Personal protective equipment (PPE) used in handling PCBs 		
Non-porous PCB wastes	 PCBs Equipment such as capacitors, transformers, switchgears, circuit breakers, heat transfer systems, etc. with PCB concentration of dielectric oil greater than or equal to 2 ppm Contaminated components removed from such equipment such as windings; PCB-contaminated containers and equipment such as metal drums, tanks, pumps, and metal filters, etc. 		

Any dielectric oil or porous materials can only be classified as PCB-free if it has less than 2 ppm of PCBs. Similarly, a non porous material can be classified as PCB-free only if the PCB concentration is less than or equal to $10 \ \mu g/100 \text{cm}^2$ based on a wipe test.

3.2 IDENTIFICATION AND CLASSIFICATION PROCESS

The process for the identification and classification of PCBs is illustrated in Figure 4. As presented in the figure, the first step in the identification process is to check for laboratory analysis. In the absence of laboratory analysis, the next step is to conduct nameplate inspection. Other factors to consider in the identification process include checking of maintenance/historical records, application of assumption rules, and conduct of screening and analysis. These processes are further discussed in the succeeding subsections.



Figure 4. PCB Identification Process





* No maintenance records or no information on maintenance automatically classified as PCB-Contaminated

3.2.1 Check for Laboratory Analysis

Laboratory test provides both actual PCB concentrations and verification of PCB presence. Some tests provide only an overall concentration of PCBs, while other tests may identify the presence of individual PCB congeners.

In the Philippines, the acceptable laboratory analysis is done using the US Environmental Protection Agency method 8082 (PCB Aroclors) by Gas Chromatography-Electron Capture Detection (GC-ECD). This packed-column GC-ECD is a sensitive and inexpensive test to operate. This procedure can be used to analyze spill site samples, transformer oils, and other similar media.

When checking the laboratory results, the dielectric oil of the equipment must have a PCB concentration of less than 2 ppm. Otherwise, the equipment should be included in the Treatment and Disposal Plan as part of the PCB Management Plan.

For dielectric oil with PCB concentration less than 2 ppm, the following criteria should be satisfied:

- Method of analysis should be in accordance with EMB MC 2014-007 (Guidelines for the Registration of Laboratories to Perform Analysis of PCBs in Transformer Oil, Waste Oil and Non-Porous Surface Materials); and
- Equipment has not been maintained after analysis as further discussed in Section 3.2.3 of this Guidelines

If both criteria were satisfied, the equipment containing the said dielectric oil can be classified as PCB-free. Otherwise, the equipment shall be classified as "Equipment with Unknown PCB Concentration" and be included in the SAP as part of the PCB Management Plan.

3.2.2 Inspection of Nameplate

The equipment nameplate is essential as it contains several technical specifications that can be used to determine the PCB classification. For equipment with nameplate, the presence of PCBs can be verified by checking whether any of the trade names of PCBs (listed in Annex 1 of this Guidance) appear on the nameplate. For equipment containing dielectric oil or heat transfer fluid, the type of oil cooling system as well as the year and origin of manufacture indicated on the nameplate can be used in identifying whether the equipment contains PCBs. Moreover, some equipment nameplates indicate the PCB concentration of the dielectric oil.

Equipment with no nameplate and has no laboratory analysis attesting that the concentration of the dielectric oil is less than 2 ppm is automatically classified as PCB Equipment.

3.2.2.1 Date and Origin of Manufacture

PCB classification may also be undertaken using the year and origin of manufacture. In view of the fact that the last recorded production of PCBs worldwide (except for Russia) was 1989, any equipment manufactured from 1990

and earlier are considered PCB equipment. For equipment manufactured in Russia, the cut-off year is 1994.

3.2.2.2 Oil Cooling System

The type of oil cooling system can be identified through the "Cooling" or "Class" specification. On the other hand, some nameplates simply indicate the oil cooling system code below the equipment brand.

If the nameplate indicates the following oil cooling system, then it can be assumed that the equipment contains PCBs and should be subjected to appropriate treatment and disposal:

- CNAN (Clophen Natural Air Natural)
- LNAN (Askarel Natural Air Natural)
- CNAF (Clophen Natural Air Forced)
- LNAF (Askarel Natural Air Forced)
- CFAF (Clophen Forced Air Forced)
- LFAF (Askarel Forced Air Forced)

On the other hand, if the nameplate shows any of the following abbreviations for type of cooling, then it can be assumed that the equipment does not contain PCBs unless it has undergone maintenance activities since purchase, which could be a cause of PCB contamination:

- SN (Synthetic Natural)
- ON (Oil Natural)
- ONAN (Oil Natural Air Natural)
- OA (Mineral Oil Air, US Standard)
- OAF (Mineral Oil Air Forced, US Standard)
- ONAF (Oil Natural Air Forced)

3.2.2.3 PCB Concentration of the Dielectric Oil

Some nameplates indicate the PCB concentration of the equipment's dielectric oil. This information can also be used to classify the equipment. Classification shall depend on the concentration of the dielectric oil and shall be consistent with the PCB classification indicated in Table 3 of this Guidance

Nameplates indicating PCB concentration less than 2 ppm should be supplemented by maintenance/historical records to prove that the equipment has not been maintained since purchase to classify it as PCB-free. On the other hand, equipment with nameplates indicating presence of "Non-PCB Oil" and has not undergone maintenance activities since purchase shall be classified as "Equipment with Unknown PCB Concentration". However, if maintenance activities have been conducted for these two cases, the equipment shall be classified either as "PCB-Contaminated Equipment" or "Equipment with Unknown PCB Concentration", depending on the concentration of the oil used during equipment maintenance.

Equipment with nameplates indicating PCB concentration from 2 to less than 50 ppm shall automatically be classified as "Non-PCB Equipment".

3.2.3 Checking of Maintenance/Historical Records

If the equipment was determined not to contain PCBs based on laboratory analysis or nameplate inspection, further steps have to be undertaken to affirm that the equipment indeed does not contain PCBs. Maintenance/historical records shall be checked to determine whether any maintenance activity (e.g., oil replacement, oil top-up, retrofitting, or retro-filling) was performed on the equipment after analysis or since purchase.

If the maintenance/historical records of the equipment is not available or not sufficient to prove that no maintenance activity was conducted on the equipment after analysis or since purchase, then the equipment can be subjected to various screening and analysis methods for further identification or be included in the Treatment and Disposal Plan as part of the PCB Management Plan.

3.2.4 Classification of Capacitors and Hermitically Sealed Equipment

For capacitors and other hermetically sealed equipment, the classification will be based on nameplate information. Equipment that were manufactured earlier 1990 shall be assumed to contain PCBs. Otherwise, it can be assumed that the equipment does not contain PCBs.

3.2.5 Conduct of Screening

Various methods are available in screening materials, equipment, or wastes potentially containing PCBs. These methods include, but are not limited to, the following:

- Density Test
- Chlorine Test

These methods are detailed in the succeeding subsections. A discussion on protocols in sampling is presented in Annex 3 of this Guidance to guide the Registrants in sample collection for screening and analysis. Furthermore, relevant safety precautions must be employed while conducting these tests. Section 7.0 of this Guidance presents proper health and safety techniques in handling PCBs.

3.2.5.1 Density Test

This test compares the density of dielectric oil to the density of water to determine the presence of PCB. The test is conducted as follows:

- a. Put about 5 milliliters (mL) of water in a 10-mL test tube or sample container.
- b. Add 3 drops of dielectric oil in the test tube.
- c. If the sample sinks to the bottom, it is a confirmed PCB oil. Dispose the sample in accordance with the procedures specified in Section 6.0 of this Guidance.
- d. If the sample floats, further tests shall be conducted to ascertain whether the dielectric oil is contaminated with PCBs as there is a possibility that the oil only contains low concentration of PCB.

3.2.5.2 Chlorine Test

Chlorine test works on the principle of chlorine detection. However, this test also detects other chlorine-containing compound such as trichlorobenzene, which may also be found in dielectric oil. As such, these compounds may cause a result known as a false positive.

Table 5 identifies the chlorine tests that can be used for PCB identification along with the characteristics of each test.

Chlorine Test	Matrix	Detection Limit	Method of Chlorine Detection
Clor-N-Oil 50 ppm	Oil	50 ppm	Colorometric
			reaction
L2000 DX	Oil, soil, water, wipes	2 ppm	Ion specific
Chloride Analyzer			electrode

Table 5. Chlorine Tests for PCB Identification

The screening process is not confirmatory; it is just one way of screening the material, equipment, or wastes for the purpose of initial identification and classification. Laboratory analysis in accordance with MC 2014-007 is the only acceptable way to determine the PCB concentration for the purpose of declaring a PCB-free status.

4.0 INVENTORY

PCB inventory is conducted to compile an accurate list of PCBs (identification, location, condition, service history, PCB quantities, disposition, among others), assist in ensuring integrity and safe management of equipment containing PCBs, and ascertain proper treatment/disposal. More importantly, the PCB Inventory Report serves as basis of the PCB Management Plan.

In compliance with DAO 2004-01 and EMB MC 2015-004, all registrants are required to conduct an inventory of PCBs and report the same through the Online PCB Database not later than one (1) month from receiving the electronic approval of the PCB CCO Registration or registration certificate.

General process for conducting the PCB Inventory is illustrated in Figure 5 while a detailed discussion is presented in the succeeding subsections.



Figure 5. Process of Conducting PCB Inventory

4.1 DETERMINE EQUIPMENT/MATERIALS THAT MAY CONTAIN PCBs

The first step in conducting PCB Inventory is to check whether an establishment is using, storing, handling, or dealing with materials, equipment, or wastes that may contain PCBs. Table 6 presents the list of regulated equipment materials in accordance with the CCO for PCBs.

Type of Applications	Description
Enclosed applications	Transformers
	Capacitors
	Voltage regulators
	Oil circuit breakers
	Other electrical equipment containing dielectric
	fluids
Partially Enclosed	Hydraulic fluids
Applications	Heat transfer fluids
Open-Ended	Lubricants
Applications	Casting waxes
	Surface coatings
	• Adhesives
	• Plasticizers
	• Inks
	• Other uses
Wastes	Discarded PPE
	Waste dielectric or insulating oil
	Discarded packaging materials
	• PCB-based heat transfer and hydraulic fluids
	• PCB-contaminated solvents (solvent washings)
	• Material used in cleaning PCB equipment or
	absorbing the spillages
	 Laboratory wastes with PCBs
	• Discarded PCB equipment and equipment parts

 Table 6. List of Equipment/Materials Possibly Containing PCBs

4.2 INSPECT NAMEPLATE

Equipment nameplate (Exhibit 2) provides vital information on the technical specification of the dielectric fluids contained therein. Relevant information that must be noted and recorded from the equipment nameplate includes:

- Type of equipment
- Serial number
- Power rating
- Manufacturer name
- Year of manufacture
- Dielectric tradename
- Weight of dielectric oil
- Weight of equipment



In some cases, equipment nameplate also discloses concentration of PCBs in the dielectric oil at the time of manufacture.

4.3 INSPECT PHYSICAL CONDITION OF THE EQUIPMENT AND THE SURROUNDING ENVIRONMENT

The physical condition of the equipment can give indication of any actual or potential releases of PCBs in the environment. For non-plated equipment, the physical condition can also aid in establishing the classification of PCB equipment in accordance with Section 3.0 of this Guidance.

Information that should be noted in inspecting the physical condition of the equipment includes:

- Liquid level
- Signs of leaks
- Signs of corrosion

Critical in the inspection process is to check the surrounding environment of the equipment, especially if the equipment is PCB-containing. Important considerations include identifying presence of nearby flammable material and describing the surrounding environment of the equipment.

4.4 REVIEW EQUIPMENT MAINTENANCE RECORDS

Maintenance records can provide information in assessing whether dielectric oil is potentially contaminated with PCBs. In general, equipment containing mineral oil requires more frequent maintenance such as retrofilling or topping compared to PCB-filled equipment.

Considering that retrofilling companies or third party maintenance service providers do not generally decontaminate the tools or materials used during maintenance activities, the possibility of PCB cross contamination is highly likely. Thus, as part of the inventory process, it is important to note the type of maintenance activity conducted for the equipment and the time it was conducted.

4.5 CHECK AND REVIEW SAMPLING AND ANALYSIS RECORDS

For equipment that are not hermetically sealed, sampling and analysis of the equipment's dielectric oil and/or its interior surface (using wipe test) can help ascertain the PCB concentration. In addition, screening processes as discussed in Section 3.2.5 of this Guidance can aid in classifying the equipment, materials, or wastes. Consequently, this information must be noted during the inventory process.

If the equipment or material has been subjected to laboratory analysis, the following information should be recorded in addition to attaching the copy of the laboratory analysis results:

- Sampling number and date
- PCB concentration
- Name of laboratory that performed the analysis

If other screening process has been conducted, such should be recorded including the results (e.g. whether positive or negative for PCBs if density test was conducted).

4.6 CHECK AND REVIEW HAZARDOUS WASTE TRANSPORT & TSD MANAGEMENT

For establishments that generate PCB wastes, record of hazardous wastes transport and treatment, storage, and disposal (TSD) management must be checked and reviewed. These records include:

- Hazardous wastes registration for L404 (PCB wastes)
- Manifests
- Permit to Transport
- Certificate of Treatment
- Hazardous wastes storage area inspection records

Information that must be noted includes:

- Quantity of PCB wastes
- PCB waste management method; whether onsite storage or through registered TSD facility
- If onsite storage, description of the storage facility must be documented
- If through registered TSD, required compliance information per DAO 2013-22 must be taken into account such as name of the TSD facility and the corresponding permit number, specific treatment/disposal process

4.7 SUBMIT INVENTORY INFORMATION

Data and information collected from the previous processes must be inputted through the Online PCB Database (<u>www.emb.gov.ph/philpcbtracker</u>). The online submission PCB inventory is outlined in Figure 6.

As seen in the figure, registrants must log-in using the e-mail address and password inputted in the online registration form. The online inventory forms for each of the PCB equipment and PCB waste must be completely filled out. Equally important is the need for all inventoried equipment and/or waste to be inputted into the Online PCB Database. For example, if there are 100 PCB-containing equipments in the establishment, then the Registrant must fill up 100 online inventory forms.

Registrants must ensure that all required information are complete because the Online PCB Database will not successfully proceed to submission if there is any lacking information. Furthermore, the inventory should be accurate because concerned EMB RO will conduct monitoring and validation.

To guide the registrants in navigating the Online PCB Database, the Operation and Administration Manual of the Online PCB Database can be used as reference.

After completing all information, the registrant shall then submit the information by clicking the 'Submit Inventory Info to EMB for Review' in the Checklist tab to submit the inventory. This will trigger an automatic email to the concerned EMB RO notifying for the need to review the submitted inventory. The concerned EMB RO is tasked to review the inventory, then prompt the Online PCB Database to send an email of acknowledgement to the registrant regarding the receipt of the inventory and instruct them to proceed with the preparation of the PCB Management Plan.



4.8 UPDATE PCB INVENTORY

The Online PCB Database is designed considering the requirements of the PCB Inventory and implementation of the PCB Management Plan.

Updating of PCB Inventory is accomplished in the same manner as the submission of the initial PCB Inventory (Section 4.7 of this Guidance). For example, after testing, screening, or analysis of "Equipment with Unknown PCB Concentration" have been conducted; registrants must update their inventory and provide all applicable information as required in the Online PCB Database. In addition, the following shall be reported in the Inventory Updating:

- Monitoring of status (e.g. in-use, standby, decommissioned, in-storage, etc.) of PCB equipment, PCB-contaminated equipment, and non-PCB equipment
- Monitoring of the planned treatment and disposal plan

5.0 HANDLING, STORAGE, AND TRANSPORT

Proper handling, storage, and transport are important to avoid unnecessary contact with PCBs and to prevent associated health impacts. Protocols for handling (including packaging and labeling), storage, and transport are discussed in this section.

5.1 HANDLING, PACKAGING, AND LABELING

Handling, packaging, and labeling practices for PCBs and PCB wastes shall be in accordance with the following subsections.

5.1.1 Handling

PCBs must be handled in a manner that will prevent human exposure and accidental releases to the environment. Proper handling shall include, but not be limited to, the following practices:

- Ensuring that appropriate PPEs are used when handling PCBs. Hazards during handling include the possibility of skin contact, inhalation of vapors, fall from elevations (when working on heights), and others. For these matters, proper use of PPE is required. Protective clothing to be with worn varies individual circumstances such as concentration and quantity of PCBs, and activity being done.
- Inspecting equipment and containers for leaks, holes, rust, or elevated temperature. Any inconsistencies regarding this should be followed by repackaging and relabeling, if necessary.
- Ensuring that handling is conducted at temperatures designed for work environment, if possible, because of the increased volatility of PCBs at higher temperatures. Where this cannot be controlled and where the liquid temperature exceeds 55°C; airpurifying respirator with organic vapor cartridge should be worn for the period of exposure.
- Ensuring that spill containment measures are available and sufficient to contain liquid wastes, if spilled. Floor drains should be plugged

Things to Consider in Determining Proper PPE when Handling PCBs:

- Respiratory protection
 - ✓ Air purifying respirators if handling hot PCBs or if working at ≥ 55 °C; otherwise
 - ✓ Dust mask if working in dusty area
- Skin Protection
 - ✓ Tyvek or similarly chemically impervious disposable overalls if directly handling PCB liquids or if there are splashing hazards
 - Long sleeve shirt if no direct handling (e.g. conduct of inspection)
 - ✓ Chemical resistant gloves (double layer if collecting samples)
- Eye and skin protection
 - ✓ Full face shield (if splashing hazard is present)
 - ✓ Half face shield (if there is no splashing hazard)
 - Safety glasses in dusty areas; can be worn together with halfface shield
- Protection from other physical hazards
 - ✓ Steel-toed, non-slip safety shoes
 - ✓ Chemical resistant boots if handling PCB spills or when working in PCB contaminated areas
 - ✓ Hard hat if there are falling hazards

during handling operations, and the appropriate solvent and absorbent materials should be readily available in case of leaks.

- Placing plastic sheeting or absorbent mats under containers before opening them if the surface of the containment area is not coated with a smooth surface material (e.g., paint, urethane, epoxy, etc.).
- Removing liquid wastes either by detaching the drain plug or by pumping with a self-suctioned pump and suitable chemical-resistant tubing.
- Using dedicated pumps, tubing, and drums, not used for any other purpose, to transfer liquid wastes.
- Cleaning up any spills with prepared cloths, paper towels, or absorbents.
- Triple rinsing of contaminated surfaces with the appropriate solvent such as kerosene.
- Treating all absorbents and solvent from triple rinsing, disposable protective clothing, and plastic sheeting as wastes containing or contaminated with PCBs when appropriate.

To ease handling, use of handling equipment such as forklifts and drum lifters may be employed. The necessary training for the operation of these equipment shall be provided to the designated employees.

5.1.2 Packaging

PCBs set for storage must be properly packaged to prevent leakages or releases to the environment. To this effect, materials consisting of, containing, or contaminated with PCBs shall be properly packaged in accordance with DAO 2013-22 before storage or transport. Table 7 lists the appropriate storage containers for PCBs.

Type of PCB	Storage Container	Container Specifications
 PCB oil and PCB- contaminated oil Liquid PCB wastes 	UN (United Nations) 1A1 Approved Drums	 210-Liter capacity Closed-headed double bung Made of 16 gauge or heavier steel Painted or treated to prevent rusting

 Table 7. Storage Container Specifications per PCB Type

Type of PCB	Storage Container	Container Specifications
 PCB oil and PCB- contaminated oil Liquid PCB wastes 	UN approved steel intermediate bulk container (IBC) as UN 31A	Capacity, and dimensions are dependent on the volumetric requirements of the establishment
Solid PCB wastes	UN TA2 approved drums	 Securely attached, removable steel lid, and a gasket made of PCB- resistant material (e.g. nitrile rubber, cork, teflon) Made of 18 gauge or heavier steel Painted or treated to prevent rusting
Decommissioned PCB equipment, PCB-contaminated equipment, and non- PCB equipment (with or without oil)	Sea Containers with Container Safety Convention approval	 Made of steel or other strong and durable material that will prevent PCB from being released or from affected by weather. In some instances, a drip tray or curbed floor will suffice. Standard 20-foot freight container equipped with drip tray inside (with proper labeling, manifest, and transport permit, and ready for transport into a TSD Facility)

Type of PCB	Storage Container		Container Specifications
	UN 1A2 approved drums	٠	210-L capacity
		•	Securely attached,
			removable steellid, and a
			gasket made of PCB-
			resistant material (nitrile
			rubber, cork, teflon)
		٠	Made of 18 gauge or
			heavier steel
		•	Painted or treated to
			prevent rusting

5.1.3 Labeling

All PCBs must be properly labeled in accordance with this Guidance for ease of identification and management. Labeling shall be conducted in compliance with the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals. The following minimum information are required in the label:

- Hazard warning or symbol
- Name of the establishment
- CCO registration number
- Serial number of the unit
- Other identifying information
- Schedule of disposal
- Person-in-Charge
- Address
- Contact Number

Annex 4 presents the required labels for various PCB types.

5.2 STORAGE

Permitting requirements and storage periods specified in DAO 2013-22 must be complied with. Procedures in developing a storage facility for PCBs are discussed hereafter.

5.2.1 Design Requirements

PCB storage facilities must be designed in such a way as to ease the proper handling and management of PCBs. The following are the minimum requirements for a storage facility:

- Impervious surfaces
- Partitions
- Spill Containment and External Protection
- Access Control and Restriction

5.2.1.1 Impervious Surfaces

Storage areas shall be constructed using materials that will not allow the passage of PCB fluids or other liquids that may present risks to the safe storage of PCBs. Roof material, flooring, and walls shall be adequately impervious to prevent

rainwater from reaching stored items. In addition, floors of the storage facilities shall:

- Be constructed from impermeable materials such as marine concrete (dolomite or magnesite) or steel to prevent the PCB fluids or other liquids from leaching into the ground
- Have no cracks or openings of any kind
- Be strong enough to endure the load of heavy-duty equipment as well as filled and stacked containers, and that cracks or fractures will not occur

All surfaces shall be smooth, continuous, impervious, and sealed with PCB-resistant coating, such as epoxy or resin paint, to prevent the release of PCBs in case of spills during handling operations.

5.2.1.2 Partitions

PCBs shall be stored separately with secondary containment from other chemicals, if the storage area is not to be used exclusively for PCBs. In cases where PCBs are to be stored with other chemicals, a partition shall be installed or sufficient space separation shall be ensured to prevent mixing of chemicals in the event of a spill. Solvents or other flammable materials shall be separated by a fire-proof barrier or distanced adequately.

5.2.1.3 Spill Containment and External Protection

The storage area shall be equipped with a spill containment system, designed to prevent leakage of PCBs into the environment in the event of a spill. A prime example is a continuous curbing with adequate height to accommodate at least twice the volume of the stored PCBs. This curbing shall be constructed along the perimeter of the storage facility to prevent any spilled material from flowing out.

For added external protection, guard rails or bumper posts shall be installed outside the facility. These shall serve as protection against traffic accidents and other similar incidents with the potential to cause release of PCBs within the facility.

5.2.1.4 Access Control and Restriction

The storage site shall be enclosed by a wall or a woven chain-link security fence, at least two meters high, and equipped with a gate sufficiently large enough for forklifts and other large equipment to go through. An entry permit system shall be implemented to control and monitor the access of all individuals. Full-time security staff shall also be employed to prevent theft and other untoward incidents. For added security, entrance to the storage site shall always be locked when not in use.

Ultimately, the storage facility shall be secured with the abovementioned strategies, and yet should not impede optimal operations by, for example, being accessible to material handling equipment such as forklifts and drum lifters.

5.2.1.5 Other Provisions

The design of the storage facility shall at all times be consistent with the requirements of the Philippine Occupational Safety and Health Standards.

Equipment and materials not used for handling PCB equipment or wastes shall not be permitted inside the storage facility to minimize hazards. The storage facility shall also maintain sufficient room for internal access; that is, access for forklifts and other machineries and movement of large equipment.

5.2.2 Signage/Labeling

All storage facilities shall have a signage (Figure 7) with the following information:

- *"Contains PCBs"* in large letters including total volume and total weight of PCBs. For storage facilities with regular changes in inventory, this signage shall be updated monthly.
- Warning that the facility contains toxic chemicals and that it must be handled by authorized personnel only.
- Contact person, including address and telephone number.

CO	NTAINS	PCB	s!
		Inventory as of:	
	ТҮРЕ	Total Volume	Total Weight
\bigcirc	PCB Liquid		
	PCB-Contaminated Liquid		
Cardon a	PCB Equipment		
	PCB-Contaminated Equipment		
	PCB-Contaminated Porous Material		
· · · · · ·	PCB-Contaminated Non-Porous Material		
TO BE HANDLED BY	Non PCB Equipment		
	PCB-free Liquid		
UNLT	PCB-free Porous Material		
	PCB-free Equipment		
	PCB-free Non-Porous Material		
	PCB Waste		
	TOTAL		
	Name of Establishment:		
	CCO Registration Number:		
	Person-in-Charge:		
	Address:		
	Contact Number:		
	Date Checked:		
	Checker:		
	Designation/ Position of Checker:		

Figure 7. Label for Storage Areas

In accordance with the Globally Harmonized System of Classification and Labeling of Chemicals, Safety Data Sheets of PCBs shall be made available at each storage facility.

Internally, the storage facility shall bear clear signage identifying which specific section of the facility is appropriated to which PCB type or PCB waste. This shall be done to ease handling and other activities.

5.2.3 Regular Inspection

To ensure that the storage facility is kept in optimal condition, it shall be inspected at least monthly. Defects, deficiencies, and other conditions which may affect the integrity of stored PCBs as well as those contributory to them (i.e., personnel, machinery) shall be identified. Following the inspection, an action plan shall be prepared for each defect identified, where ensuing actions to correct them shall be specified.

All observations shall be recorded, indicating the name of the inspector and the date of inspection. In addition, records shall be retained, subject for inspection by the concerned EMB RO. As discussed, the date and time of entry of new items into the storage facility shall be recorded.

5.3 HANDLING AND STORAGE DURING DECOMMISSIONING

Decommissioning refers to the retirement of equipment from active service. Safety protocols during decommissioning must be established to prevent environmental releases of PCBs and exposure of workers. These are discussed in the succeeding subsections.

5.3.1 Handling and/or Storage during Decommissioning

Precautionary measures shall be implemented during decommissioning of PCBs, particularly in the handling and/or storage procedures. Handling and/or storage procedures depend on the type of equipment being decommissioned. The succeeding subsections present guidance in handling and/or storage of different types of PCBs during decommissioning; as well as guidance in handling the equipment used in decommissioning and in transferring of PCB oil and PCB-contaminated oil.

5.3.1.1 Decommissioning of Capacitors

Sealed capacitors to be decommissioned shall be placed into 210-Liter gauge-18 steel or UN IA2 approved steel drum, fitted with removable lids and gaskets made of PCB-resistant material, such as nitrile rubber, cork, or Teflon. Bigger capacitors shall be placed in a leak-proof metallic basin filled with absorbent material adequate to absorb the liquid in case of leak.

5.3.1.2 Decommissioning of Transformers

Small transformers to be decommissioned may be stored or transported in leakproof containers, without draining, in a manner similar to that for capacitors. Spill containment shall also be provided. PCB oil and PCB-contaminated oil of large decommissioned transformers pending transport for disposal shall be drained from the transformer and stored in doublebung closed-top UN 1A1 approved steel drums. However, this activity shall only be undertaken by registered TSD Facility in accordance with DAO 203-22.

PCB oil and PCB-contaminated oil stored in bigger storage tanks other than in 210-Liter steel drums shall be:

- Stored above ground
- Properly labeled
- Regularly inspected
- Protected from weather conditions
- Provided with spill containment

5.3.1.3 Decommissioning of Other PCB Equipment, PCB-Contaminated Equipment, and Non-PCB Equipment

Other equipment such as hydraulic equipment, circuit breakers, electromagnets, vapor diffusion pumps, and heat transfer equipment with PCB concentrations greater than or equal to 2 ppm shall be removed from service. Pending environmentally sound treatment and disposal, the equipment shall be put into storage drums similar to the protocol for decommissioning capacitors and transformers.

5.3.2 Handling of Equipment Used in the Decommissioning Process

Equipment and accessories used in the decommissioning process shall be made of brass or stainless steel. Hoses shall be made of flexible material, stainless steel, or lined with tetrafluoroethylene or silicone polymers. Drip trays shall be placed under all pumps, valves, and hose couplings. In addition, equipment and accessories used for decommissioning of equipment containing PCBs shall only be used for this purpose to avoid cross-contamination of PCBs.

5.3.3 Transferring of PCB Oil and PCB-Contaminated Oil

Transfer of PCB oil and PCB-contaminated oil shall be through pumping, rather than pouring, to minimize splashing and spillage. Centrifugal pumps shall be used, with all wetted surfaces made of stainless steel. The shaft seal shall be an external carbon ring type to eliminate exposure of the packing material to the deteriorating effects of PCB. In addition, equipment and accessories used for transferring PCB oil and PCB-contaminated oil shall only be used for this purpose to avoid cross-contamination of PCBs. This activity shall only be done by registered TSD Facilities per DAO 2013-22.

5.4 TRANSPORT REQUIREMENTS

Transporting PCBs outside the premises of the establishment shall only be conducted by an EMB-registered PCB waste transporter. All EMB-registered PCB waste transporter shall:

- Observe the precautions listed herein during the transport of PCBs
- Ensure that transport vehicles are equipped with a PCB spill kit, complete of the required contents as listed in Section 5.4.2 if this Guidelines

• Ensure that assigned drivers are trained as specified in Section 5.4.3 of this Guidance

Other transport requirements are discussed in the succeeding subsections.

5.4.1 Precautions during Transport

PCBs shall be transported using vehicles in good condition under the supervision of trained and experienced personnel in compliance with DAO 2013-22 and with the following conditions:

- All loading and unloading operations shall be carried out with care to avoid any damage which may result in leakage and spillage.
- Drums or waste equipment shall be clearly marked with appropriate label.
- Drums or waste equipment shall be loaded and fastened securely so that they are in an upright position and will not move about or fall off the vehicle. Drain spouts, cooling tubes, and the bushings of the transformers shall be adequately protected to avoid damage during transport.
- Vehicles transporting PCBs in drums shall have high fencing on both sides, preferably with a canopy.
- Vehicles shall have hazard warning panels clearly marked with black indelible ink against yellow retro-reflective background. The panels shall be displayed at the front and rear of the vehicle in a position that does not conceal any lights, license plates, or other legally required signs or markings.
- Vehicles shall be equipped with safety equipment and a spill clean-up kit.
- Complete load of PCBs shall be covered with tarpaulin to prevent rainwater from being in contact with the drums or the equipment.
- Vehicles shall not carry any passenger or any flammable dangerous goods in the cargo compartment.
- Load the cargo carefully calculating equal load in the front and in the end of the truck bed.
- Avoid any internal movement of load.

5.4.2 PCB Spill Kit on Transport Vehicles

The transport vehicle carrying PCBs shall be equipped with a PCB spill kit, whose contents are shown in Table 8, for immediate and remedial action in case of accidental spills.

Quantity	Items
1	List of Spill Kit Contents
1	Emergency Contact List
1	Safety Data Sheet for PCBs
2 pairs	Chemical Resistant Clothing or Similar Coveralls
2 pairs	PCB-Resistant Knee Length Safety Boots
2 pairs	PCB-Resistant Gauntlets
2 pairs	Goggles
1	Fire Extinguisher, Dry Chemical 4.5 kg
1	Brush, Bannister and Pan
2	Bags – Polyethylene Waste Disposal, Double Sealed
	at Bottom, 915 mm x 1200 mm x 1300 mm
3 sets	Early Warning Device

Table 8. List of PCB Spill Kit Contents

Quantity	Items
1 bag	Absorbent Material (cement bag size)
1	Spill Kit Container for Above Equipment and
	Material
1	Long Handled Shovel
1	First Aid Kit

5.4.3 Driver Requirements

All drivers transporting PCBs shall be properly trained. At a minimum, the training of drivers shall include the following:

- Instructions concerning the hazardous properties of PCBs
- Use of firefighting equipment, spill kit, and other emergency equipment that may be necessary in case of accidents involving the vehicle or the PCB onboard
- Use of PPEs
- Labeling and packaging of PCBs
- Manifest system

The driver shall also ensure that upon arrival at a TSD facility, he/she informs the officer responsible for the TSD facility what is contained in the load and unloads at a location decided by the TSD facility operator. He/She shall immediately present the manifest upon arrival at the TSD facility.

6.0 ENVIRONMENTALLY SOUND TREATMENT AND DISPOSAL

All PCBs shall be treated, decontaminated, and disposed of in an environmentally sound manner consistent with the requirements of RA 6969, DAO 1992-29, DAO 2004-01, DAO 2013-22, and other relevant environmental laws before a PCB-free declaration can be attained.

The treatment and decontamination process shall only be performed by EMBregistered TSD facilities in accordance with the requirements of DAO 2013-22 and EMB MC 2015-004 including the application of pre-treatment process such as:

- Size reduction
- Dewatering
- Oil-water separation
- Mechanical separation

In addition, all equipment, materials, or wastes shall undergo sampling and analysis after treatment and decontamination to certify that these are PCB-free (below 2 ppm for oil, equipment, or porous materials; or less than or equal to 10 μ g/100 cm² for non-porous materials). This certification shall be through a PCB-free Certificate to be secured from an EMB-registered laboratory to perform PCB analysis in oil, materials, or wastes.

7.0 HEALTH AND SAFETY

A Health and Safety Plan (HASP) related to PCBs must be prepared, implemented, and monitored for effectiveness; provided that such Health and Safety Plan has been submitted as part of the PCB Management Plan to the concerned EMB RO for approval. At a minimum, the Health and Safety Plan shall include the following:

- Organizational Set-up of the Health and Safety Committee which shall clearly identify the specific personnel, their position, their contact details, and the responsible person for the dissemination of information contained in the HASP;
- Hazard Identification, Risk Assessment, and Corresponding Controls which shall list the site-specific hazards associated with planned industrial activities as well as the prevention and control of these hazards;
- PPE Program which shall include the list of PPEs needed to protect workers based on the hazards and risks identified;
- Medical Surveillance or Worker Health Monitoring which shall be in place for employees that are potentially exposed to PCBs; and
- Personnel Training which shall be undertaken for all personnel handling PCBs in accordance with Section 9.0 of this Guidelines.

The Health and Safety Plan shall be reviewed and updated based on the results of the PCB Management Plan monitoring.

8.0 EMERGENCY PREPAREDNESS AND RESPONSE

A comprehensive written Emergency Preparedness and Response (EPR) Plan must be prepared that shall be reviewed at least annually and revised if necessary. The EPR Plan shall, at the minimum, contain the following:

- Organizational set up and structure of the EPR Team detailing their responsibilities;
- Discussion on the potential emergencies involving PCBs that may occur in the establishment's area of responsibility, which shall be based on the hazard identification and risk assessment conducted as part of the HASP preparation required in Section 7.0 of this Guidelines;
- Pre-emergency activities, which shall include but not be limited to the conduct of EPR drills, PPE management, and provision of emergency response equipment;
- Emergency communication and reporting protocols;
- Overall site control and PCB cleanup strategies;
- Follow-up actions after a PCB incident;
- Personnel training on the EPR Plan; and
- Medical surveillance program for the EPR Team

In the EPR Plan, the capability of nearby emergency services and neighboring communities must be taken into account. Such plan shall be periodically tested and shall involve nearby emergency services and neighboring communities, as practicable. Correspondingly, the EPR Plan must be reviewed and revised (if necessary) after periodical testing and occurrence of emergency incident(s).

8.1 **RESPONDING TO ACCIDENTAL PCB RELEASES**

PCB accidental releases such as leaks and spills shall be cleaned up within fortyeight (48) hours from their discovery in accordance with the approved EPR Plan submitted and approved by the concerned EMB RO as part of the PCB Management Plan.

All active leaks shall be addressed by employing containment and/or confinement strategies, whichever is applicable. Daily inspection by competent personnel wearing the appropriate PPE shall be done to prevent exposure.

All materials that have come in contact with PCBs while performing emergency response to address the PCB release shall be considered as hazardous wastes and shall be handled in accordance with DAO 2013-22.

Environmental media affected by the PCB release shall be cleaned up in accordance with relevant rules and regulations.

8.2 REPORTING PCB RELEASES

Any PCB releases shall be reported within twenty-four (24) hours from the time of the incident using the Environmental Incident Reporting Form in DAO 2014-02: Revised Guidelines for Pollution Control Officer Accreditation. Likewise, this incident shall form part of the Self-Monitoring Report submitted in the succeeding reporting schedule.

9.0 PERSONNEL TRAINING

Registrants must ensure that appropriate trainings are provided to all personnel and staff directly handling PCBs. EMB-registered waste transporters and TSD facilities must also comply with the training requirements set forth in this Guidance.

These personnel and staff shall be made knowledgeable about PCBs and its health hazards through training on the following:

- RA 6969: Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 including DAO 2013-22: Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36)
- DAO 2004-01: CCO for PCBs, EMB MC 2015-002: Clarifications to the CCO for PCBs, and this Guidance
- Safety and Health Training
 - Existing Local and Departmental Occupational Hazard
 - Application of Different PPE with regards to the occupational hazards
 - o Safety Signs and other equipment safeguards
 - Emergency Preparedness

In addition, these personnel and staff shall have supplementary training on the following:

- Sampling, Analysis, and Monitoring
- Safety and Health Training
- Handling, Storage, and Transport of PCBs
- Identification and Inventories
- Environmentally Sound Treatment and Disposal
 - Decommissioning
 - o Treatment and Decontamination
 - o Disposal

10.0 SUBMISSION OF PCB MANAGEMENT PLAN

Each establishment using or handling any PCBs must submit PCB Management Plans, subject to the approval of the concerned EMB RO. The requirements for the PCB Management Plan are stipulated in EMB MC 2015-004, while the submission process is presented in Figure 8.

Submission of PCB Management Plans is through the Online PCB Database (<u>www.emb.gov.ph/philpcbtracker</u>) using the e-mail address and password inputted in the online registration form.

When the concerned EMB RO prompts the Online PCB Database to send an email of acknowledgement to the registrants regarding the receipt of the inventory as discussed in Section 4.7, the Online PCB Database shall simultaneously make the PCB Management Plan tab clickable.

Subsequent to the acknowledgement of the Online PCB Inventory, the establishment's PCO will receive an e-mail from the concerned EMB RO regarding the approval of the PCB Inventory and that they can now proceed to the preparation of their PCB Management Plan.

Upon accessing the PCB Management Plan page, the following information must be inputted per material, equipment, or wastes:

- Schedule of decommissioning, decontamination, treatment, and disposal of equipment
- Schedule of disposal of wastes

Furthermore, the following components of the PCB Management Plan shall be attached:

- Sampling and Analysis Plan
- Health & Safety Plan
- Emergency Preparedness and Response Plan
- Storage Facility Closure Plan

After inputting all information and attaching all requirements, the registrants shall click the 'Submit PCB Management Plan to EMB' in the Checklist tab to submit the PCB Management Plan.

The submitted PCB Management Plan shall be subjected to evaluation of the concerned EMB RO within 30 days. If the Plan is approved, the concerned EMB RO shall prompt the Online PCB Database to send an email to the designated PCO with the attached letter of approval of the Plan. On the other hand, if the Plan is disapproved; the concerned EMB RO shall prompt the Online PCB Database to send an e-mail informing the establishment of the reason for the disapproval along with a new deadline for complying with the requirements.

The implementation of the PCB Management Plan shall then be monitored and validated by the concerned EMB RO.



Trade Names of PCBs

Aceclor (t) Adkare1 ALC Apirolio (t, c) Aroclor (t, c) (USA) Aroclor 1016 (t, c) Aroclor 1221 (t, c) Aroclor 1232 (t, c) Aroclor 1242 (t, c) Aroclor 1254 (t, c) Aroclor 1260 (t, c) Aroclor 1262 (t, c) Aroclor 1268 (t, c) Areclor (t) Arubren Asbestol (t, c) ASK Askarel^a (t, c) (USA) Bakola Bakola 131 (t, c) Biclor (c) Chlorextol (t) Chlorinated Biphenvl Chlorinated Diphenyl Chlorinol (USA) Chlorobiphenyl Clophen (t, c) (Germany) Clophen-A30 Clophen-A50 Clophen-A60 Clophen Apirorlio Cloresil Clorphen (t) Delor (Czech Rep.) Ciaclor (t, c) Dialor (c) Disconon (c) Dk (t, c)Ducanol Ducanol (c) Dykanol (t, c) (USA) Dyknol **EEC-18** Electrophenyl T-60 Elemex (t, c) Eucarel Fenchlor (t, c) (Italy) Hexol (Russian Federation)

Hivar (c) Hydol (t, c) Hydrol Hyvol Inclor Inerteen (t, c) Kaneclor (KC) (t, c) (Japan) Kaneclor Kaneclor 400 Kaneclor 500 Keneclor Kennechlor Leromoll Magvar MCS 1489 Montar Nepolin Niren No-Flamol No-Flamol (t, c) (USA) No Flamol Nonflammable liquid PCB PCBs Pheneclor Phenoclor (t, c) (France) Phenoclor Phenoclor DPS Plastivar Pydraul (USA) Pyralene (t, c) (USA) Pvrochlor Pyroclor (t, c) (USA) Saf-T-kuh (t, c) Saft-Kuhl Santotherm (Japan) Santotherm FR Santoterm Santovac Santovac 1 Santovac 2 Siclonyl (c) Solvol (t, c) (Russian Federation) Sovol Sovtol (Russian Federation) Therminol (USA) Therminol FR

t = transformer

c = capacitor

^a Askarel is also the generic term used for nonflammable insulating liquid in transformers and capacitors.

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Sample CCO Registration Certificate of PCBs
Republic of the Philippines Department of Environment and Natural Resources ENVIRONMENTAL MANAGEMENT BUREAU DENR Compound, Visayas Avenue, Diliman, Quezon City 1116 Telephone Nos.: 927-15-17, 928-20-96 Email : emb@emb.gov.ph Visit us at http://www.emb.gov.ph
Registration Certificate Number CCO-PCB-Rxxx-yyy-zzzzz
CCO REGISTRATION CERTIFICATE
Pursuant to Republic Act 6969 (Toxic Chemical and Hazardous and Nuclear Waste Control Act) and implemented by DENR Administrative Order 1992-29 (Implementing Rules and Regulation of RA 6969) and DENR Administrative Order 2004-01 (CCO for Polychlorinated Biphenyls), this CCO Registration Certificate is issued to
COMPANY NAME Facility Address
for having complied with the Chemical Control Order requirements as
subject to the following:
TER IS IND CON TTIONS
 Company Name point submit Periodic nated Bit nenyls (PCBs) inventory and PCB Management Plans, a prescribed by Memorandum Circular 2015-004 (Clarifications to the CCO of PCBs). Company Name must or rolly with the proper storage, handling, labelling and disposal requirement or accordance with the UC2004-01, DAO 2013-22(Revised Procedures and Standar's with the Management of Hazardous Waste (Revising DAO 2014-36)), MC 2015-004 and outprovision of RA 6969. Company Name must consist sense of management of the PCB equipment. Company Name that be held liable in cases of injury or damage to public health and the anylor ment as shall properly compensate the affected parties and/or restore damegument and shall properly compensate the subjected to the penalty provision of RA 2004. Any violation of the Terms and Conditions stipulated shall be subjected to the penalty provision of RA 99.
Issued on
Regional Director
OR #: Amount: OR Date

Protect the environment... Protect life...

Protocols in Sampling PCBs

The objective of sampling is to collect a sample of sufficient size such that it represents the concentration of the medium. Procedures for collecting a representative sample include development of a sampling plan, determining the sample volume and sampling containers, sampling documentation, and sampling procedures. These procedures are discussed in detail in the succeeding subsections.

A. Sampling Plan

Prior to the conduct of the actual sampling, the Registrant shall develop a sampling plan containing the following and submit the same as part of the PCB Management Plan:

- a) Sampling procedures
- b) Health and safety protocols
- c) Sample preservation procedures
- d) Quality assurance (QA) and quality control (QC)
- e) Decontamination procedures
- f) Sampling documentation

B. Sample Volume and Sampling Containers

Sample volume and sampling container depend on the type of medium being tested. Table A-1 summarizes the minimum required volume and the special container or material for collection of each medium.

Medium	Required Volume	Special Container or Material for Collection
Dielectric oil	100 mL	 Syringe 100 mL glass bottle or jar with Teflon- lined lid
Surface	10 cm x 10 cm	 100 mL glass bottle or jar with Teflon- lined lid Gauze pad (3" x 3", pharmaceutical grade) Stainless steel forceps Solvent Steel template or disposable cardboard template (10 cm x 10 cm)

Table A-1. Required Volume	e and Special Contair	er or Material for	Collection
	per Type of Medium	L	

A field blank (empty capped) shall be prepared for each type of container used to collect samples and be submitted to the testing laboratory as a QC check.

Furthermore, a different set of container or material for collection shall be used for each sample source to prevent cross-contamination of PCB samples.

C. Sampling Documentation

Sampling personnel shall have a field logbook to record the following information during sampling:

- Name of personnel who conducted the sampling
- Time, date, and location of sampling
- Type of sample
- Sampling method
- Reasons for obtaining the sample
- Photos or sketch of sample area and sampling layout

D. Sampling Procedures

1. Transformer Oils

In sampling transformer oils, only personnel experienced in dealing with transformers shall be allowed to take oil samples. The personnel shall implement the following procedures to ensure safe and effective sampling:

For transformers with drain value

- a. Open the transformer drain valve.
- b. Drain 100 mL of the transformer oil into an appropriate container. (For transformer oils, use a glass bottle or jar with Teflon-lined lid.)
- c. Close the transformer drain valve.
- d. Cap and seal the container. For containers with lids that are not Teflonlined, cover the bottle or jar with solvent-rinsed aluminum foil and cap.
- e. Label the containers and place them in an ice chest.



For transformers without drain valve

- a. Remove the lid of the transformer.
- b. Using a syringe, draw 100 mL of the transformer oil into an appropriate container.
- c. Reinstall the lid of the transformer.
- d. Cap and seal the container. For containers with lids that are not Teflonlined, cover the bottle or jar with solvent-rinsed aluminum foil and cap.
- e. Label the containers and place them in an ice chest.

2. Solid Surface

Sampling personnel shall perform the following steps for sampling solid surfaces:

- a. Dip the gauze pad into the solvent.
- b. Hold moistened gauze pad with stainless steel forceps and rub thoroughly over a 100 cm2 area of the sample surface.
- c. Swab in horizontal direction with one side of the swabbing material and repeat in the vertical direction with the other side.
- d. Place gauze pad in a pre-cleaned glass bottle or jar, capped, labeled, and sealed.

Sample Labels for PCB Equipment, Material, and Wastes

Polychlorinated Biphenyl (PCB) is a high	PCB Oil PCB ≥ 500 ppm
Name of Establishment: CCO Reg. Number: Serial Number: Equipment Code: Other Identifying Informa	Түре : tion:
SCHEDULE OF DISPOSAL	
THIS UNIT HAS BEEN CLASSIFIED BY: GAS CHROMATOGRAPHY SCREEN TESTING OTHERS:	Name of PCO: Address: Contact Number:
Sample #: Date Analyzed: Name of Laboratory: EMB Registration No.:	

Figure A-1. Label for PCB Oil

Polychiorinated Biphenyl (PCB) is a hig	B-Contaminated Oil ppm ≤ PCB < 500 ppm
Name of Establishment: CCO Reg. Number: Serial Number: Equipment Code: Other Identifying Informa	Type :
SCHEDULE OF DISPOSAL	Name of PCO:
THIS UNIT HAS BEEN	
CLASSIFIED BY: Gas chromatography screen testing others:	Address: Contact Number:
CLASSIFIED BY: CLASSIFIED BY: Gas CHROMATOGRAPHY CSCREEN TESTING COTHERS: CATURATION CONTRACT	Address: Contact Number:

Figure A-2. Label for PCB-Contaminated Oil

Figure A-3. Label for PCB Equipment

PC PC Polychlorinated Biphenyl (PCB) is a high	B Equipment PCB ≥ 500 ppm
Name of Establishment: CCO Reg. Number: Serial Number: Equipment Code: Other Identifying Informa	Type of Equipment: tion:
SCHEDULE OF DISPOSAL	
THIS UNIT HAS BEEN CLASSIFIED BY:	Name of PCO: Address:
SCREEN TESTING OTHERS:	Contact Number:
Sample #: Date Analyzed: Name of Laboratory:	
EMB Registration No.:	

50	Equipment ppm ≤ PCB < 500 ppm
Name of Establishment:_ CCO Reg. Number: Serial Number: Equipment Code: Other Identifying Informa	my toxic substance classified as "Persistent Organic Pollutant Type of Equipment: ation:
SCHEDULE OF DISPOSAL	
SCHEDULE OF DISPOSAL	Name of PCO:
SCHEDULE OF DISPOSAL THIS UNIT HAS BEEN CLASSIFIED BY: Gas chromatography	Name of PCO: Address:
SCHEDULE OF DISPOSAL THIS UNIT HAS BEEN CLASSIFIED BY: GAS CHROMATOGRAPHY SCREEN TESTING OTHERS:	Name of PCO: Address: Contact Number:
SCHEDULE OF DISPOSAL THIS UNIT HAS BEEN CLASSIFIED BY: GAS CHROMATOGRAPHY SCREEN TESTING OTHERS: Sample #:	Name of PCO: Address: Contact Number:

Figure A-4. Label for PCB-Contaminated Equipment

Figure A-5. Label for PCB-Contaminated Porous Material

Polychlorinated Biphenyl (PCB) is a high	B-Contaminated Porous Material PCB ≥ 2 ppm ay toxic substance classified as Persistent Organic Pollutant
Name of Establishment: CCO Reg. Number: Serial Number: Equipment Code: Type : Other Identifying Information:	
SCHEDULE OF DISPOSAL	
THIS UNIT HAS BEEN CLASSIFIED BY:	Name of PCO:
THIS UNIT HAS BEEN CLASSIFIED BY: Gas chromatography screen testing	Name of PCO: Address:
THIS UNIT HAS BEEN CLASSIFIED BY: Gas chromatography screen testing others:	Name of PCO: Address: Contact Number:
THIS UNIT HAS BEEN CLASSIFIED BY: GAS CHROMATOGRAPHY SCREEN TESTING OTHERS:	Name of PCO: Address: Contact Number:
THIS UNIT HAS BEEN CLASSIFIED BY: GAS CHROMATOGRAPHY SCREEN TESTING OTHERS: Sample #: Date Analyzed: Name of Laboratory:	Name of PCO: Address: Contact Number:



Figure A-6. Label for PCB-Contaminated Non-Porous Material

Figure A-7. Label for Non-PCB Equipment

Non-PCB Equipment 2 ppm ≤ PCB < 50 ppm Name of Establishment: CCO Reg. Number: Serial Number: Equipment Code:_ Type of Equipment: Other Identifying Information: SCHEDULE OF DISPOSAL Name of PCO: THIS UNIT HAS BEEN **CLASSIFIED BY:** Address: GAS CHROMATOGRAPHY SCREEN TESTING Contact Number: OTHERS: Sample #: Date Analyzed: Name of Laboratory: EMB Registration No.:



Figure A-8. Label for PCB-Free Oil, Equipment, and Porous Material

Figure A-9. Label for PCB-Free Non-Porous Material

